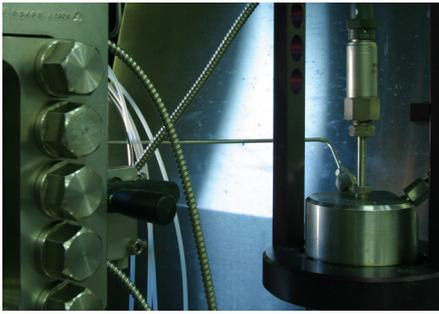


# IFP SCHOOL

THE GRADUATE SCHOOL FOR ENERGY AND TRANSPORTATION PROFESSIONS

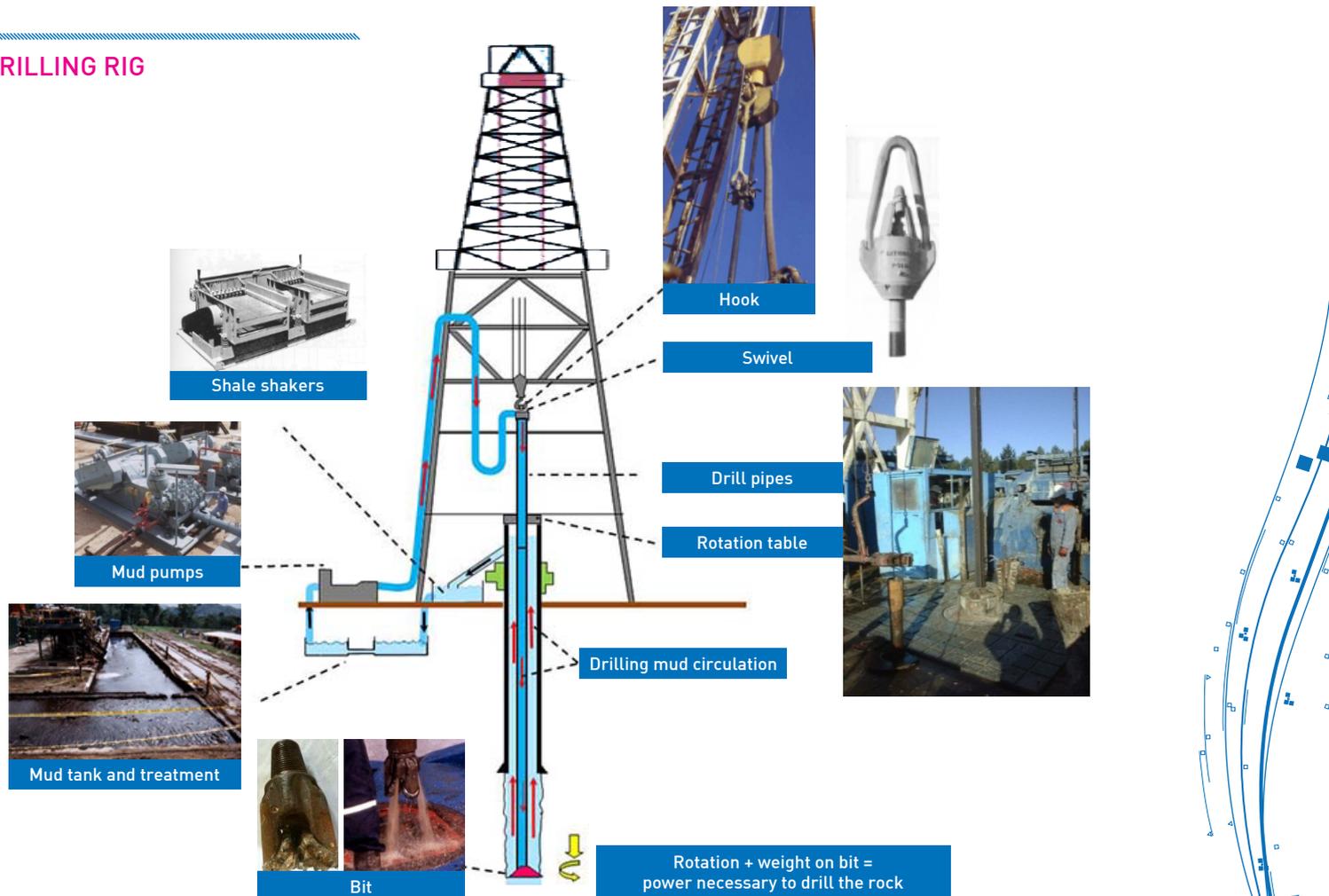


## What is a drilling fluid?

**W**hen drilling a well, a liquid drilling fluid (often called drilling mud) is injected at high pressure inside the drill pipes. The drilling mud goes through the drill bit and through the annular between the drill pipes and the borehole at a sufficient velocity to be able to carry the rock excavated by the drill bit up to the surface.

After returning to the surface of the well the used drilling fluid flows directly to the shale shakers where the larger rock cuttings are removed from the drilling mud. Once processed by the shale shakers the finer solids from the drilling fluid are finally removed by other solids control equipment. Complementary treatments are necessary to clean and to give back to the drilling mud its initial properties (viscosity, density,...). Then the drilling fluid is sent into the mud tanks where it is re-injected by the mud pumps inside the drill string. So, the drilling mud circulates in a closed loop.

### DRILLING RIG



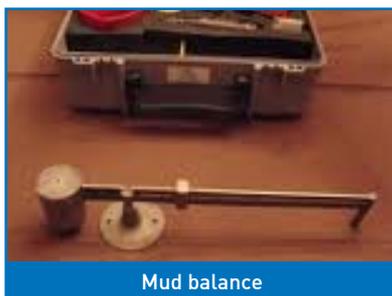
# Drilling mud

Drilling mud has different roles during the drilling process:

- maintain the well security by applying a sufficient pressure on the drilled formations to avoid any unexpected influx into the wellbore from the fluid contained in the gaps of the rocks,
- clean the well by carrying out drill cuttings, thus providing valuable data on the drilled formations,
- maintain wellbore stability,
- lubricate and cool the drill bit.

The drilling mud is made to fulfill all these roles. Its characteristics are defined according to the properties of the drilled formation (type of rock, pore pressure, presence of fractures,...). Different drilling fluids therefore need to be used, as during the drilling process, different kind of formations are encountered.

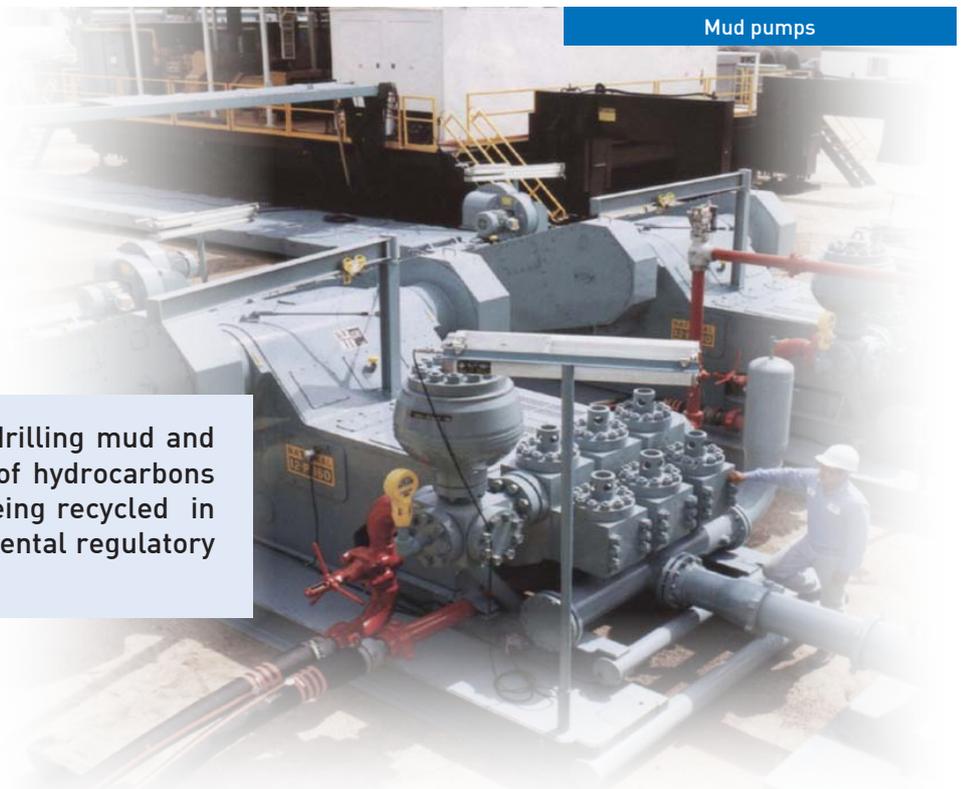
In practice the drilling mud properties are monitored and regularly adjusted by a mud engineer in order to keep the well safe and to ensure the effectiveness of the drilling process. Different measuring tools are used. The Fann mud balance is a way of monitoring mud density.



The main components of a drilling fluid are usually the continuous fluid phase and solid particles. The continuous fluid phase is either water, or an oil/water emulsion, or occasionally foam.

Solid particles added to the continuous fluid phase mainly:

- allow weight to be added to the drilling mud so as to adapt its density to pressures encountered during the drilling process,
- allow the drilling mud viscosity to be adjusted so that cuttings can be efficiently lifted to the surface,
- maintain the homogeneity of the mud.



At the end of the drilling process, drilling mud and cuttings are cleaned of any traces of hydrocarbons and chemical compounds before being recycled in compliance with applicable environmental regulatory requirements.

#### For more information:

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